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Nonverbal communication between registered nurses and patients during chronic disease management consultations: Observations from general practice

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Abstract

Aims and objectives: This study explores nonverbal communication behaviours between general practice nurses and patients during chronic disease consultations. Background: Nonverbal communication is an important aspect of nurse–patient lifestyle risk reduction conversations. Despite the growing role of general practice nurses in lifestyle risk modification when managing chronic disease, few studies have investigated how this communication occurs. Design: Observational study within a concurrent mixed methods project. Methods: Thirty-six consultations by 14 general practice nurses were video-recorded between August 2017 and March 2018. Video analysis used the Nonverbal Accommodation Analysis System. The STROBE checklist was used to guide this paper. Results: Joint convergence of nurse–patient behaviours such as laughing, smiling and eye contact was most common (44%; n = 157). Patient–nurse eye contact time decreased significantly across the consultation, while nurse gesturing increased significantly. No significant relationship between consultation length and convergent to divergent behaviour categorisation or nurse–computer use across the consultation was found. Conclusions: The high levels of convergent behaviours are promising for person-centred care. However, scope exists to enhance nonverbal interactions around lifestyle risk reduction. Supporting nurses with skills and improved environments for lifestyle risk communication has potential to improve therapeutic relationships and patient outcomes. Relevance to clinical practice: These results indicate that nurses support patients through nonverbal interactions during conversations of lifestyle risk reduction. However, there are opportunities to improve this practice for future interventions.

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Results. Joint convergence of nurse-patient behaviours such as laughing, smiling and eye contact were most common *(44%; n=157)*. Patient-nurse eye contact time decreased significantly across the consultation, while nurse gesturing increased significantly. No significant relationship between consultation length and convergent to divergent behaviour categorisation or nurse-computer use across the consultation was found.

Conclusions. The high levels of convergent behaviours are promising for person-centred care. However, scope exists to enhance nonverbal interactions around lifestyle risk reduction. Supporting nurses with skills and improved environments for lifestyle risk communication has potential to improve therapeutic relationships and patient outcomes.

Relevance to clinical practice. These results indicate that nurses support patients through nonverbal interactions during conversations of lifestyle risk reduction. However, there are opportunities to improve this practice for future interventions.

Keywords

Nonverbal communication, primary care, nurse, observational research, nurse-patient interaction, general practice, patient relations.

Impact statement:

What does this paper contribute to the wider global clinical community?

- Insight into nonverbal interactions can inform nurses supporting lifestyle risk reduction.
- Understanding the needs of nurses in lifestyle risk communication can improve supports provided by educational providers and employers.

1. INTRODUCTION

Globally, rates of chronic disease are increasing. Lifestyle risk factors such as smoking, inadequate nutrition, harmful alcohol intake and insufficient physical activity all contribute to the development of chronic disease. Addressing these lifestyle risk factors is a recognised step in achieving health and wellbeing and the Sustainable Development Goals (United Nations, 2015; World Health Organization, 2017). However, managing chronic disease is complex, particularly when government policy and funding inadequacies support the globalisation of unhealthy lifestyles and rapid unplanned urbanisation (World Health Organization, 2015).

For many patients, primary care is their first point of contact with the health care system (Britt et al., 2016). General practice, also known as primary care or family practice, coordinates and provides both acute episodic and preventive health care for people in the community across the lifespan (American Academy of Family Physicians, 2019; The Royal Australian College of General Practitioners, 2018). However, international efforts for detecting and addressing lifestyle risk in general practice remain inadequate (Bryant et al., 2015).

One strategy to address this has been the expansion of the nursing role in general practice. Governments in Australia, New Zealand and the United Kingdom have implemented policies supporting GPN workforce growth to meet the increasing demands in primary care (Australian Medicare Local Alliance, 2012; Health Workforce New Zealand, 2011; Primary Care Workforce Commission, 2015). General practice nurses (GPNs) are either diploma trained enrolled nurses or baccalaureate (or equivalent) prepared registered nurses (Australian Primary Health Care Nurses Association, 2017b; Ministry of Health, 2003). Despite the positive policy environment and growth in their numbers, the impact of GPNs on patient care remains poorly understood, particularly in terms of lifestyle risk reduction.

Health promotion and illness prevention are fundamental components of nursing, and are a specific focus of the GPN role (Australian Primary Health Care Nurses Association, 2017a; World Health Organization, 2019). Opportunistic and planned communication about lifestyle risk and

behaviour change forms a key component of nurse-patient relationships in general practice, encouraging patient health literacy and self-management (Halcomb, Ashley, James, & Smyth, 2018). Nurses working in general practice are ideally placed to support lifestyle risk reduction due to their approachability and ongoing relationship with their patients (Young, Eley, Patterson, & Turner, 2016).

2. BACKGROUND

Communication of lifestyle risk, including potentially emotional subjects such as weight management, requires a person-centred approach (James, Halcomb, Desborough, & McInnes, 2019). Such an approach assists in tailoring verbal and nonverbal messages in line with patients' coping skills as well as their emotional, informational and comprehension needs (D'Agostino & Bylund, 2014; Duggan & Parrott, 2001). Involving patients in clear and tailored communication for behaviour change is necessary to improve patient care, trust, satisfaction, engagement, enablement and other health outcomes (Desborough et al., 2018; Mason & Butler, 2010; Street Jr, Makoul, Arora, & Epstein, 2009).

Verbal communication techniques, such as motivational interviewing, are both person-centred and directive and have been used successfully in primary care targeting behaviour change (Noordman, van der Weijden, & van Dulmen, 2012; Rollnick & Miller, 1995). However, how we accommodate behaviour through language and nonverbal interactions are also important to person-centred approaches to communication (Giles, Coupland, & Coupland, 1992). Nonverbal communication is a broad term consisting of those interactions with or without speech such as how we sound, behave and what is expressed with each other and our environment (Blanch-Hartigan, Ruben, Hall, & Schmid Mast, 2018). Paraverbal communication forms part of both verbal and nonverbal communication with examples including speech rate and intensity, pauses, and pronunciation (Rusu & ChiriȚĂ, 2017). The personalisation of messages given from paraverbal communication adds meaning to verbal communication, such as tone and attitude (Rusu & ChiriȚĂ, 2017). In this paper, the term nonverbal includes both paraverbal and nonverbal communication.

Nonverbal communication is an important aspect of communication between health professionals and patients in the assessment of pain, infection, mental health conditions, neuromuscular conditions, and cognitive impairment as well as hearing or visual disturbance (Ambady, Koo, Rosenthal, & Winograd, 2002; Blanch-Hartigan et al., 2018; Chambers, 2003). Interactional elements of nonverbal communication are important for the expression and meaning needed for perceptions, attentiveness and engagement during consultations (Hall, Horgan, & Murphy, 2019; Timmermann, Uhrenfeldt, & Birkelund, 2017). This may consist of facial cues, eye contact, touch, body posture and position, distance, or interactions with technology (Ambady et al., 2002; Blanch-Hartigan et al., 2018; Noordman, Verhaak, van Beljouw, & van Dulmen, 2010). For example, a patient who is not making eye contact with the nurse may be uncomfortable about the conversation or have some additional information that they are reluctant to share. Alternatively, a nurse who focuses on a computer screen throughout the consultation may convey a level of disinterest in the patient, thereby influencing the nurse-patient interaction (Pearce et al., 2012).

While nonverbal communication is necessary for effective nurse-patient interactions, this is seldom discussed in the nursing literature. Previous nursing research on nonverbal communication has been conducted in settings such as mental health, cardiology, critical, palliative and disability care (Chambers, 2003; de Rezende et al., 2015; Kozłowska & Doboszynska, 2012; Pounds, 2010; Varndell, Fry, & Elliott, 2017). Nonverbal communication is important for the direct and indirect outcomes of care such as patient disclosure, engagement, rapport, satisfaction and enhanced cognitive and physical function (Ambady et al., 2002; Duggan & Parrott, 2001; Robinson, 2006), attributes necessary for lifestyle risk communication (James, McInnes, Halcomb, & Desborough, 2020). However, the issue of non-verbal communication is largely absent in the primary care literature and in literature related to lifestyle risk conversations (James, Halcomb, et al., 2019).

This paper examines nonverbal communication behaviours between nurses and patients in Australian general practice during chronic disease management (CDM) consultations, where conversations about lifestyle risk are likely to occur. This study is part of a larger concurrent mixed

methods project, which sought to explore the perceptions of, and approaches used for lifestyle risk communication by registered nurses in Australian general practice. Firstly, consecutive CDM consultations with nurses and their patients were video recorded to allow non-participatory observation. Concurrently, semi-structured interviews were conducted with participating nurses to explore their perceptions of lifestyle risk communication. This paper reports the quantitative analysis of the video observation data. Due to the volume of data collected in the larger dataset of the project, other analysis, such as the interview findings, are reported elsewhere (James et al., 2020).

3. METHODS

3.1 Design

This paper reports the quantitative phase of a concurrent mixed methods study. The 'Strengthening the Reporting of Observational Studies in Epidemiology' (STROBE) statement was used to guide the development of this paper (Supplementary File 1)(Equator Network, 2019).

3.2 Setting and participants

Fifteen registered (baccalaureate prepared) nurses were recruited from two Primary Health Networks on the East Coast of Australia between August 2017 and March 2018. PHNs are Australian government funded and independently managed local health organisations which support primary health care service delivery within the local community (Department of Health, 2018). The selection of PHNs was made on the basis of their geographical proximity to the research team. Recruitment occurred through direct contact with general practices within the study area and communication with professional networks, such as the Australian Primary Health Care Nurses Association (APNA) and Primary Health Networks. Nurses were eligible if they were baccalaureate, or equivalent, prepared Registered Nurses and provided CDM consultations. While there is no clear guide for sampling in video observation research (James, Desborough, McInnes, & Halcomb, 2019), a sample of 15 nurses and 40 patients were considered to represent a manageable dataset that would likely yield a variety of practice patterns.

To mitigate selection bias, participating nurses recruited 2-4 consecutive patients attending for CDM consultations. Patients were eligible to participate if they were adult, English speaking, presenting for a chronic disease health assessment, care plan or nurse-led assessment and able to provide informed consent. CDM consultations were targeted due to the likelihood of lifestyle risk conversations being undertaken.

3.3 Data collection

Both nurses and patients provided consent for the recording of the consultation and basic demographic data. Participating nurses sought consent from patients and managed the video-recording. Video data were recorded using two Go Pro Hero Session 4 cameras with micro SD cards (James, Desborough, et al., 2019). One camera faced the patient and the other, the nurse. To ensure consistency in approach, GPNs were orientated to video recorder operation before data collection took place. Camera recording was activated simultaneously using a remote control operated by the nurse at the beginning and end of the consultation. Recordings were securely stored on a password protected laptop computer. Video slicing for analysis was undertaken by SJ using Windows Movie Player Version 2012 (Microsoft Corp., 2012). A detailed description of the video data collection methods is reported elsewhere (James, Desborough, et al., 2019).

3.4 Ethical considerations

Ethical approval was obtained from the University of Wollongong Human Research Ethics Committee (Approval No. 2016/381). Privacy and confidentiality was assured by ensuring access, analysis and storage of videos was only undertaken by the research team. No incentives were offered for participation.

3.5 Data analysis

The Nonverbal Accommodation Analysis System (NAAS) was used to support analysis (D'Agostino & Bylund, 2011, 2014). The NAAS tool was used for the coding para and nonverbal indicators across the 10 behaviour categories of talk time, pauses, simultaneous speech, speech rate, interruption, smiling, laughing, gesturing nodding and eye contact (D'Agostino & Bylund, 2011,

2014). Behavioural coding unit calculations (Figure 1) were used to explore convergence, divergence and maintenance of behaviours across all behavioural categories. This tool analyses non verbal behaviours, such as eye contact, which indicate the rapport and strengthening of therapeutic relationships between patients and providers (D'Agostino & Bylund, 2014). Nurse-computer eye contact was also analysed to gain insight into GPN-computer interaction during the consultation.

The NAAS coding is undertaken using one minute segments for a two minute slice of footage at the beginning and end of each consultation (D'Agostino & Bylund, 2011; Hall et al., 2019). The technique of using thin slices of observational data has been previously shown to represent, measure and predict nonverbal communication across the consultation (Hall et al., 2019). The average of paired minute segments for each behaviour at the beginning and end of each consultation were then compared to analyse convergent to divergent accommodation alignment with the other party from the average at baseline (D'Agostino & Bylund, 2014). The average of paired minute segments of nurse-computer eye contact from the beginning to the end of consultations were categorised into increasing, staying the same, or decreasing.

The direction of paired averages from start to the end of the consultation are described as convergence, divergence and maintenance (D'Agostino & Bylund, 2014). Convergence indicates a mirroring or adoption of behavioural similarity to the other person such as through language or body position (Donovan & Forster, 2015; Giles et al., 1992). Accommodation, through convergence, indicates a person-centred approach to communication, a building of rapport and therapeutic relationships (D'Agostino & Bylund, 2014; Donovan & Forster, 2015). Divergent accommodation, however, shows behaviour moving away from the other party to accentuate difference such as through speech rate or talk time (Dragojevic, Gasiorek, & Giles, 2016). Both convergence and divergence may occur asymmetrically where only one party adopts either convergent or divergent accommodative behaviours (D'Agostino & Bylund, 2011). The distance or control created by neither party aligning or diverging behaviour with the other indicates behavioural maintenance (D'Agostino & Bylund, 2014; Donovan & Forster, 2015).

Coded data were entered into SPSS Version 25 (IBM Corp., 2012) for analysis. Categorical data was summarised descriptively using frequency, percentage and continuous data using mean, standard deviation, median and interquartile range. The Wilcoxon Signed Rank test was used to test change of behaviours between the beginning and end of consultations. Due to small expected cell counts a Fishers Exact Test was used to assess the significance of the relationship between convergent to divergent behaviours and consultation time. As mean consultation time in general practice is approximately 15 minutes (Britt et al., 2016), 15 minute intervals were used to categorise consultation length (<15 minutes, 15-29 minutes, 30-44 minutes, 45-59 minutes, > 60 minutes) and significance calculated with behavioural categorisation. Nurse computer eye contact time was categorised as either increasing, decreasing or staying the same and significance calculated in the same way.

	Behaviour	Coding unit
Paraverbal	Talk time	Speech duration (secs)/60 secs.
	Pauses	Pause duration (secs)/60 secs.
	Simultaneous speech	Simultaneous speech duration (secs)/60 secs.
	Speech rate	Number of syllables per 60 secs/talk time (secs) of that speaker.
	Interruption	Interruption frequency of that speaker/talk time (secs) of the other party.
Nonverbal	Smiling	Smiling frequency/60 secs.
	Laughing	Laughing frequency/60 secs.
	Gesturing	Gesturing frequency/talk time of that speaker per 60 secs.
	Eye contact	Eye contact duration/60 secs.
	Nodding	Nodding frequency/talk time (secs) of the other party.
	GPN-computer eye contact	Eye contact duration (secs)/60 secs.

Figure 1. NAAS and nurse-computer behavioural coding units (D'Agostino & Bylund, n.d.)

3.6 Validity, reliability and rigour

The NAAS has been previously demonstrated to have acceptable inter-rater (*r=0.81 to 0.96*) and intrarater (*r=0.82 to 1.0*) agreement (D'Agostino & Bylund, 2011). Five consultations were coded by two reviewers to evaluate inter-rater reliability (SJ and CA). Intraclass correlation coefficients revealed the reliability for each behavioural indicator to be above acceptable levels (*ICC range 0.835-0.999*). The remaining consultations were coded by the first author (SJ).

4. RESULTS

Forty consultations from 15 nurses were video-recorded. Due to sub-optimal camera positioning and the resultant difficulties in viewing behaviours for analysis, four consultations were excluded. Therefore, 36 consultations between 36 patients and 14 nurses across 13 general practices were included in the analysis. Consultations ranged from 8.3-69.3 minutes in duration *(mean 28.7 minutes)* and provided a total of over 17 hours of video footage.

4.1 Participant and consultation characteristics

All GPNs were female and their mean age was 43.5 years *(Range 25-66 years; SD 11.8)*. Most had initially qualified as a registered nurse in Australia *(n=11; 78.6%)* and just over half held a bachelor's degree as their highest qualification *(n=8; 57.1%).* GPN participants had a mean of 15.8 years *(range 2-35 years; SD 9.6)* nursing experience and had worked in general practice for a mean of 7.2 years *(range 1-18 years; SD 5.3 years).* The GPN participants perceived that they were moderately *(n=5; 35.7%)* to extremely prepared *(n=3; 21.4%)* and very confident *(n=6; 42.9%)* in lifestyle risk communication. Patient participants were mixed in terms of gender *(female n=20, 55.5%)* and had a mean age of 66.9 years *(range 22-82 years; SD 13.6).* Reasons for presentation related to review of care plan *(n=20; 55.6%),* new care plan *(n=8; 22.2%),* chronic disease health assessment *(n=8; 22.2%).*

4.2. Nonverbal Accommodation

Means of the frequency or duration of each behaviour in the paired minute segments at the beginning and end of each consultation were compared to determine the direction of accommodation movement (Figure 2).

Convergence	Mirroring or adoption of behavioural similarity to others (Donovan & Forster, 2015; Giles et al., 1992)	Joint Convergence	GPN Pt 
		Asymmetrical GPN Convergence	GPN Pt 
		Asymmetrical Patient Convergence	GPN Pt 
Maintenance	Creation of control or distance by not aligning behaviour with others (D'Agostino & Bylund, 2014; Donovan & Forster, 2015)	Joint Maintenance	GPN Pt 
Divergence	Emphasizing behavioural difference from others (Giles et al., 1992)	Joint Divergence	GPN Pt 
		Asymmetrical GPN Divergence	GPN Pt 
		Asymmetrical Patient Divergence	GPN Pt 

Figure 2. Categories of behavioural movement

Analysis of nonverbal and paraverbal accommodation behaviours within each consultation are shown in Table 1. Overall, joint convergence of nurse-patient interactions was most common *(44%; n=157).* The paraverbal behaviours of talk time *(44.4%; n=16)*, pauses *(41.7%; n=15)*, interruption *(38.9%; n=14)* and simultaneous speech *(33.3%; n=12)* were most frequently categorised as joint convergence. The most frequently described asymmetrical nurse convergence behaviour was pauses *(22.2%; n=8)* and the most frequently categorised asymmetrical patient convergence behaviour was speech rate *(30.6%; n=11)*. The most frequent nonconvergent behaviours were the joint divergence of talk time and asymmetrical patient divergence of speech rate *(both 27.8%; n=10)*.

Table 1. Accommodation Categories Nurse-Patient Behaviours

	Convergence			*Maintenance*	*Divergence*		
	Joint Convergence	*Asymmetrical Nurse Convergence*	*Asymmetrical Patient Convergence*	*Joint Maintenance*	*Joint Divergence*	*Asymmetrical Nurse Divergence*	*Asymmetrical Patient Divergence*
Paraverbal (no. of consultations)							
Talk Time	16 (44.4%)	5 (13.9%)	3 (8.3%)	0 (0%)	10 (27.8%)	1 (2.8%)	1 (2.8%)
Pauses	15 (41.7%)	8 (22.2%)	3 (8.3%)	2 (5.6%)	3 (8.3%)	4 (11.1%)	1 (2.8%)
Simultaneous Speech	12 (33.3%)	5 (13.9%)	3 (8.3%)	0 (0%)	7 (19.4%)	5 (13.9%)	4 (11.1%)
Speech Rate	7 (19.4%)	3 (8.3%)	11 (30.6%)	1 (2.8%)	4 (11.1%)	0 (0%)	10 (27.8%)
Interruption	14 (38.9%)	3 (8.3%)	6 (16.7%)	1 (2.8%)	7 (19.4%)	2 (5.6%)	3 (8.3%)
Nonverbal (no. of consultations)							
Smiling	21 (58.3%)	0 (0%)	10 (27.8%)	1 (2.8%)	0 (0%)	0 (0%)	4 (11.1%)
Laughing	24 (66.7%)	4 (11.1%)	3 (8.3%)	1 (2.8%)	2 (5.6%)	2 (5.6%)	0 (0%)
Gesturing	13 (36.1%)	4 (11.1%)	2 (5.6%)	0 (0%)	9 (25.0%)	2 (5.6%)	6 (16.7%)
Nodding	17 (47.2%)	5 (13.9%)	2 (5.6%)	0 (0%)	5 (13.9%)	3 (8.3%)	4 (11.1%)
Eye Contact	18 (50.0%)	5 (13.9%)	10 (27.8%)	0 (0%)	1 (2.8%)	1 (2.8%)	1 (2.8%)
Total	157 (44.0%)	42 (11.8%)	53 (14.8%)	6 (1.7%)	45 (12.6%)	20 (5.6%)	34 (9.5%)

Nonverbal behaviours such as laughing *(66.7%; n=24)*, smiling *(58.3%; n=21)*, eye contact *(50%; n=18)*, nodding *(47.2%; n=17)* and gesturing *(36.1%; n=13)* were most often categorised as joint convergence. Patient eye contact with the nurse decreased significantly over the course of the consultation *(p=0.001)*(Table 2). Although nurse-computer eye contact *(58.3%; n=21)* also decreased over the course of the consultation this was not statistically significant *(p=0.31)* (Table 2). Additionally, no significant relationship was found between behaviours and nurse-computer eye contact time *(p=0.06–1.00).* However, nurse gesturing significantly increased during the consultation *(p=0.02)*. Fisher's Exact Test showed no significant relationship between consultation

length and convergent to divergent behaviour categorisation *(p=0.15 – 0.95)* or nurse computer use across the consultation *(p=0.92)*.

Table 2. Nurse and Patient behaviour change across consultations

	Beginning of consultation		End of Consultation		Z score [a]	p value
	M (SD)	Median (IQR)	M (SD)	Median (IQR)		
Paraverbal						
Nurse talk Time	0.49 (0.18)	0.45 (0.39-0.61)	0.53 (0.22)	0.53 (0.35-0.67)	-1.08	0.28
Patient Talk Time	0.36 (0.17)	0.34 (0.25-0.46)	0.31 (0.20)	0.24 (0.17-0.42)	-1.59	0.11
Nurse Pauses	0.03 (0.04)	0.02 (0.00-0.04)	0.03 (0.04)	0.02 (0.00-0.04)	-0.62	0.54
Patient Pauses	0.01 (0.02)	0.01 (0.00-0.02)	0.02 (0.04)	0.00 (0.00-0.02)	-0.81	0.93
Nurse Simultaneous Speech	0.01 (0.02)	0.01 (0.00-0.02)	0.03 (0.04)	0.02 (0.02-0.06)	-1.87	0.61
Patient Simultaneous Speech	0.02 (0.02)	0.00 (0.00-0.03)	0.02 (0.02)	0.01 (0.00-0.04)	-0.52	0.60
Nurse Speech Rate	0.25 (0.03)	0.25 (0.23-0.28)	0.27 (0.05)	0.25 (0.24-0.28)	-1.19	0.23
Patient Speech Rate	0.28 (0.05)	0.28 (0.25-0.31)	0.37 (0.56)	0.19 (0.17-0.36)	-1.33	0.18
Nurse Interruption	0.02 (0.02)	0.00 (0.00-0.03)	0.02 (0.03)	0.00 (0.00-0.03)	-0.46	0.65
Patient Interruption	0.01 (0.01)	0.00 (0.00-0.02)	0.02 (0.02)	0.01 (0.00-0.02)	-0.71	0.48
Nonverbal						
Nurse Smiling	0.02 (0.02)	0.02 0.01-0.03)	0.02 (0.02)	0.02 (0.01-0.03)	0.00	1.00
Patient Smiling	0.01 (0.01)	0.01 (0.00-0.02)	0.02 (0.02)	0.01 (0.01-0.02)	-1.56	0.25
Nurse Laughing	0	0.00 (0.00-0.00)	0.01 (0.01)	0.01 (0.00-0.01)	-0.99	0.32
Patient Laughing	0	0.00 (0.00-0.00)	0.00 (0.00)	0.00 (0.00-0.00)	-0.89	0.37
Nurse Gesturing	0.06 (0.04)	0.05 (0.02-0.08)	0.04 (0.05)	0.06 (0.03-0.11)	-2.24	0.02*
Patient Gesturing	0.05 (0.05)	0.03 (0.00-0.07)	0.04 (0.05)	0.02 (0.00-0.06)	-0.12	0.90
Nurse Nodding	0.07 (0.05)	0.06 (0.02-0.10)	0.06 (0.05)	0.05 (0.02-0.08)	-1.09	0.28
Patient Nodding	0.06 (0.04)	0.05 (0.02-0.09)	0.06 (0.05)	0.05 (0.02-0.08)	-0.48	0.63
Nurse Eye Contact	0.45 (0.23)	0.44 (0.28-0.65)	0.46 (0.28)	0.40 (0.25-0.68)	-0.09	0.93
Patient Eye Contact	0.62 (0.24)	0.64 (0.45-0.80)	0.46 0.26	0.42 0.26-0.67)	-3.18	0.001*
Nurse-Computer Eye Contact	0.30 (0.21)	0.23 (0.15-0.47)	0.25 (0.24)	0.15 (0.04-0.50)	-1.043	0.30

[a] Wilcoxon signed rank test *$p \leq 0.05$

5. DISCUSSION

Person-centred therapeutic relationships and positive rapport are key to effective lifestyle risk communication that leads to behaviour modification (James et al., 2020). Nonverbal communication is an important component of building these relationships (D'Agostino & Bylund, 2014; Duggan & Parrott, 2001). Nonverbal communication is central to positive patient perceptions of care, satisfaction and engagement as well as outcomes including patient disclosure, information recall, improved cognitive and physical function (Ambady et al., 2002; Robinson, 2006). This study

has indicated that improved GPN nonverbal communication skills as well as strategies within the workplace are needed to support nurse-patient interactions. However, convergent behaviours shown by GPNs and patients indicate willingness for person-centred engagement during CDM consultations. As such, this paper has provides new insights into the way that nonverbal communication about lifestyle risk between nurses and patients in general practice is currently being enacted, informing nurses, educators, managers and policymakers about what is needed to help improve such communication into the future.

Communication accommodation theory indicates the adaptability of nurse and patient communication through the convergence, divergence and maintenance of behaviours (Dragojevic et al., 2016). Joint convergence, where both parties' behaviour moves towards one another, is greater in this study (44%) than found in a previous study examining the physician-patient relationship (29.9%) in the acute setting (D'Agostino & Bylund, 2014). Additionally, findings relating to combined joint convergence and asymmetrical convergence of both nurses and patients are similar to this literature (D'Agostino & Bylund, 2014). These findings may be due to social similarity between nurses and patients as well as setting where time allocation and ongoing relationships with patients differ to the acute sector (Haskard, Dimatteo, & Heritage, 2009; Young et al., 2016).

Overall patient convergence (joint convergence and asymmetrical patient convergence) represented over half (58.8%) of accommodation during the lifestyle risk interactions we observed. Similar results were found for overall nurse convergence (55.8%) of accommodation, indicating the mutuality, or positive similar communication styles, reflective of rapport building within the nurse-patient relationship (D'Agostino & Bylund, 2014; Dragojevic et al., 2016; Haskard et al., 2009). Maintaining rapport is linked to patient disclosure about barriers to health (Duggan & Parrott, 2001), an important component of motivational interviewing (Rollnick & Miller, 1995). Harnessing nonverbal convergence during CDM consultations through nursing education has potential to support barrier resolution in lifestyle risk reduction.

The effective use of convergent para and nonverbal behaviours has positive implications for information exchange, patient satisfaction and person-centred communication (D'Agostino & Bylund, 2014; de Rezende et al., 2015; Haskard et al., 2009). Nonverbal behaviours represented just over half of joint convergent accommodation, where nurse gesturing increased significantly across the consultation. Convergent behaviours including facial expression, eye contact and gestures support person-centredness, satisfaction and trust in practitioner competence (Ambady et al., 2002; Carrard, Schmid Mast, & Cousin, 2016). Tailoring or adapting nursing nonverbal communication during CDM consultations helps align patient preferences in shared decision making whilst meeting their emotional needs (Carrard et al., 2016; D'Agostino & Bylund, 2014; James et al., 2020).

Increased paraverbal communication such as interruptions, speech rate and talk time can indicate dominance, an approach potentially problematic for supportive and collaborative barrier resolution during lifestyle risk conversations but perhaps more synonymous with a biomedical approach (D'Agostino & Bylund, 2014; Siouta, Farrell, Chan, Walshe, & Molassiotis, 2019). There was some evidence of this in our study in terms of asymmetrical patient divergence of speech rate and significantly reduced patient eye contact across the consultation. However, joint divergence of talk time, interruptions and simultaneous speech might also indicate nurses and patients maintaining their own social identity through the distinctiveness or difference in communication styles over the course of the consultation (Giles et al., 1992). Whilst potentially reflective of some patterns in chronic disease presentation, behavioural distance can also be indicative of confusion, depression or invasion to personal or physical space (Ambady et al., 2002; de Rezende et al., 2015), responses that would not indicate effective communication in the consultation.

Interaction between the nurse and computer commonly seen in general practice adds complexity to the GPN-patient relationship (James et al., 2020). While decreases in nurse computer eye contact time during the consultation were not significant, previous research indicates that clinicians perceive computer use as having a negative impact on patient-centred communication (Sobral, Rosenbaum, & Figueiredo-Braga, 2015). Our findings may be related to the prioritisation

of other actions undertaken by the GPN during CDM consultations and between analysis time points. This includes activities, which can be undertaken at any stage of the consultation away from the computer screen, such as blood pressure and weight measurement. However, increased computer use, including whilst talking, can negatively impact practitioner body posture, eye contact and patient information giving during consultations (Noordman et al., 2010; Street Jr et al., 2014). Strategies such as involving patients in viewing the computer screen are viewed positively by patients, but spatial constraints in some GPN work environments make this challenging (James, Desborough, et al., 2019; Sobral et al., 2015). This has implications for patients requiring support for lifestyle risk reduction where environmental barriers such as GPN workspace and computer placement may impact on patient engagement (Pearce et al., 2012; Sobral et al., 2015).

5.1 Limitations

This study focussed on registered nurses for homogeneity as they are the largest group in the primary care workforce and have a consistent scope of practice. However, enrolled (diploma prepared) nurses also engage in lifestyle risk communication. Future research should consider the range of nurses and health professionals engaged in this communication to explore similarities and differences between professional groups. Additionally, future research could explore the communication needs of particular groups with altered communication, such as autism.

Using non-participatory video observation in general practice is a useful way of examining interactions in settings where spatial constraints exist (James, Desborough, et al., 2019). However, other nurse-patient interactions, such as informal greetings outside of the consultation room, were not captured due to the non-participatory method of video data collection (James, Desborough, et al., 2019). Video observation is known to produce large amounts of data for analysis, requiring careful consideration of research aims (Jewitt, 2012). In this analysis, in keeping with the tool used, the first and last two minutes of the consultation were analysed to address the study aim. However, the large volume of data provides opportunity for future research to examine other aspects of the broader consultation. While behavioural patterns in these data were explored, the influence of age,

gender, communication limitations of individuals and examination of quality outcomes, such as patient satisfaction, enablement and health outcomes, were beyond the scope of this study.

Given that 10 behaviours were measured in the NAAS tool each of these were compared. While the number of comaprisons increases the risk of a false positive, this paper allows the reader to draw their own conclusions by clearly articulating what was done and reporting the p values (Althouse, 2016).

6. CONCLUSION

Interventions supporting lifestyle risk reduction are needed to minimise the growing chronic disease burden and nurses in general practice increasingly provide this care. However, there is a lack of research examining nurse-patient consultations during chronic disease consultations as well as how nonverbal nurse-patient communication is enacted. This study found that collaborative and person-centred relationships formed through joint convergent accommodation of nurse-patient behaviours and nurse gesturing were promising for supporting conversations about lifestyle risk reduction. Further development of skills enhancing interactions between nurses and patients is needed to improve therapeutic relationships and patient outcomes.

7. RELEVANCE TO CLINICAL PRACTICE

GPNs' roles and ongoing relationships with patients create an ideal platform to facilitate self-management and lifestyle risk reduction. The high levels of convergent behaviours found in the study are promising in terms of person-centred care and the willingness of patients and nurses to actively engage with each other. However, there is scope to enhance nonverbal interactions by increasing nurses' nonverbal communication skills and enhancing the work environment to better support effective conversations of lifestyle risk and behaviour modification. This includes supporting patient engagement through gesturing, facial expression and eye contact as well as consideration of whether divergent behaviours such as patient speech rate and eye contact are in

line with medical history. Enhancing nurses nonverbal communication has the potential to improve therapeutic relationships during CDM consultations and enhance lifestyle risk reduction.

Conflict of Interest statement

No conflict of interest has been declared by the authors.

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